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Reliability quantification and gait loading asymmetry assessment with wearable insoles in transfemoral amputee people at different speeds

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Introduction Amputee people have gait defaults, as for example loading asymmetry, which increase with daily living situations. Replication of realistic daily living environment in a motion analysis laboratory (MAL) is difficult. Wearable pressure insoles, by providing normal ground reaction force (NGrF), can be used to quantify loading gait asymmetry in real life conditions. This asymmetry, considered as an indicator of the quality of the gait, is useful for physicians to monitor the rehabilitation progress or the prosthetic fitting suitability. The study aimed at quantifying the reliability of NGrF measurement and assessing the gait asymmetry of transfemoral amputee people with Pedoped® insoles against force plates. Walking speed effect was also evaluated on gait asymmetry for transfemoral amputee people (TFP).

Material and methods In a MAL, five active TFP walked at three self-selected speeds on level ground wearing Pedoped® insoles. Reliability was assessed by comparing NGrF obtained from both systems with Bland-Altman plots, normalized RMSE (NRMSE) and correlation coefficient. Gait loading asymmetry was computed by Absolute Symmetry Index in loading at the three self-selected speeds with insoles.

Results The mean NRMSE of NGrF was 7.2% ($\pm 2.8\%$) and 9.8% ($\pm 3.5\%$); and coefficient correlation was 0.91 and 0.95 for the prosthetic side and the intact side respectively. Loading asymmetry increased significantly with walking speed for each specific variable of NGrF.

Discussion—conclusion After overcoming the calibration problem in amputee population, Pedoped® insoles could be easily used for gait asymmetry follow-up during rehabilitation.

Keywords Insoles; Locomotion; Amputation; Rehabilitation

Disclosure of interest The authors declare that they have no competing interest.

Whiplash trauma to the vestibular system: What effect does whiplash have on the ear?

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Introduction Dizziness after traumatic acceleration/deceleration injury is well-known and the complaints voiced by these patients are similar to those of many non-trauma patients referred with vestibular sounding complaints. Patients often deny spinning but voice “non-traditional” complaints of imbalance, subtle boat like feelings and nausea. These complaints may arise because of otolithic damage from the trauma. It is traditionally thought that most vestibular pathology is unilateral and our concern is that trauma patients may have suffered bilateral damage due to the mechanism of the injury. We felt the need to document this. Pathology in these patients is important to define, as bilateral pathology is more of a challenge to compensate for.

Material and methods We assess patients with computerized dynamic posturography in our tertiary care diagnostic unit, but we also carry out vestibular-evoked myogenic potential (VEMP) assessment which can document and quantify otolithic pathology. Posturography, OVEP and CVEP results were compared in 25 whiplash trauma patients with an age and sex matched group of non-trauma patients with spontaneous vestibular disease.

Results We examined both groups of patients with respect to CVEP and OVEP abnormalities. Posturography results were not different between the two groups but there was a statistically higher OVEP abnormality rate in the trauma group when compared to the vestibular non-trauma patients. The meaning of this will be discussed.

Discussion—conclusion We will be discussing the findings in our two groups of patients. It is important to document the pathology in these patients as being vestibular, as immediate activation with “goal directed” activities in the patient with vestibular pathology is extremely important. Our concern is patients may be diagnosed with “post concussion syndrome”; the treatment for this is complete rest.

Keywords Whiplash; Diagnostics; Otoliths

Disclosure of interest The authors declare that they have no competing interest.

Dépersonnalisation et déréalisation dans les troubles de l'équilibre d'origine vestibulaire

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Introduction Les atteintes du système vestibulaire dégradent la posture, la locomotion et la stabilisation du regard. Certains patients avec une atteinte vestibulaire rapportent également des modifications de la perception de leur soi, ou des sensations d'étrangeté et d'irréalité de leur corps et leur environnement. Ces symptômes se rapprochent des troubles de dépersonnalisation et déréalisation (DD). Parce que ces symptômes sont encore peu explorés, cette étude mesure leur nature et leur prévalence chez des patients souffrant de troubles vestibulaires centraux ou périphériques et chez des sujets contrôles.

Matériel et méthodes Soixante patients consultant pour des troubles de l'équilibre ont complété des questionnaires mesurant la DD (Cambridge Depersonalization Scale), l'anxiété et la dépression (HAD Scale) après un examen otoneurologique. Un groupe contrôle incluait 60 volontaires sains appariés en âge et en sexe.

Résultats Nos données préliminaires indiquent que les patients vestibulaires rapportent fréquemment « Je me sens étrange, comme si je n'étais pas réel ou coupé du monde » (c.-à-d. dépersonnalisation : 60 %), « L'environnement autour de moi paraît détaché